gions between the second surface of the insert and the second surface of the second clamping jaw. In this way. the regions of clamping of the insert by the clamping jaws can be to a very large extent predetermined, irrespective of variations caused by the tolerances inherent in the construction of the insert and clamping jaws. As a result, the insert is always firmly held within the slot defined by the clamping jaws.

The cutting insert in accordance with the invention may be a multi-directional cutting insert in which case it will be formed with both front and side cutting edges and, in order to ensure the lateral stability of the cutting insert within a tool holder the latter can be provided with additional mechanical means for ensuring the effective clamping of the insert between the clamping jaws.

BRIEF SUMMARY OF THE DRAWINGS

For a better understanding of the present invention and to show how the same may be carried out in practice, reference will now be made to the accompanying drawings, in which:

FIG. 1 is a perspective view of a cutting insert in accordance with the invention for use in a cutting tool assembly;

FIG. 2 is a perspective view of the insert shown in FIG. 1, prior to its insertion in a tool holder forming part of the cutting tool assembly;

FIG. 3 is a perspective view of the assembled insert and tool holder; and

FIGS. 4 and 5 are side elevations of a multidirectional cutting inserts in accordance with the invention shown respectively in appropriate tool holders.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

As seen in FIG. 1 of the drawings, a replaceable cutting insert 1 is of generally prismatic shape and comprises side faces 2, front and rear faces 3 and 4, an upper surface 5 and a lower base surface 6.

The upper surface 5 comprises a cutting rake surface 7, a chip deflector surface 8, a sloping clamping surface 9 and a recessed trailing surface 10 forming an extension of the clamping surface 9.

Defined between the cutting rake surface 7 and the front face 3 is a cutting edge 11. The cutting rake surface 7 can be formed with a suitable chip former construction (not shown). The clamping surface 9 merges with the chip deflector surface 8 via an abutment shoulder 12. The clamping surface 9 slopes downwardly with respect to the base surface 6 so as to define with the base surface 6 a centrally-disposed, wedge-shaped body portion of the insert 1. The clamping surface 9 is constituted by a longitudinally extending keying groove 26 of substantially V-shaped cross-section. In a similar manner, the base surface 6 is constituted by a longitudinally extended keying groove 28 of V-shaped cross-section, the grooves 26, 28 of the surface 9 and surface 6 being oppositely directed.

insert

The recessed surface 10 defines with the rear end of the base surface 6 a trailing end portion of the insert, the height of this trailing portion being less than the height of the wedge-shaped body portion at its narrowest end.

The base surface 6 of the insert is formed with a pair of end base regions 6a and 6b and with a relatively recessed central base region 6c.

As seen in FIG. 2 of the drawings, the insert 1 is designed to be retained by a suitable tool holder. This tool holder comprises an elongated holder blade 15 at a leading end of which is formed an open-ended, wedge-shaped slot 16. The slot 16 is bounded by surfaces 17 and 18 respectively of clamping jaws 19 and 20 formed integrally as one piece with the holder blade 15. The surfaces 17 and 18 are formed as V-shaped keying ribs which are designed to mate within the V-shaped grooves formed in the surfaces 9 and 6 of the insert 1.

grooves 26/28

The holder blade 15 is designed to be retained in a holder block 21 which, in its turn, is designed to be held in a machine tool (not shown).

As shown in FIG. 3 of the drawings, the insert 1 is pushed into the slot 16 of the blade 15, with the V-shaped ribs of the surface 17 and 18 mating within the V-shaped grooves 26, 28 of the surfaces 6 and 9 and with the base regions 6a and 6b of the insert 1 firmly seated on the surface 18 of the jaw 20. At the same time, and with the insert fully inserted into the slot 16, an end portion 22 of the jaw 19 bears against the abutment shoulder 12, thereby limiting the degree of insertion of the insert 1 into the slot 16 and in this way ensuring that the cutting edge 11 of the insert 1 is always in a desired predetermined position.

By virtue of the provision of the recessed trailing end portion of the insert 1 contact between the jaw 19 and the insert 1 only takes place on the sloping surface 9, and it is ensured that the clamping force generated between the surface 17 of the jaw 19 and the corresponding sloping surface 9 of the insert 1 is localised in a region close to the trailing end of the sloping surface 9. In consequence, a resulting clamping force F_1 developed between the sloping surface 9 of the insert 1 and the surface 17 of the jaw 19 is directed intermediate to the clamping forces F_2 and F_3 generated between the surface 18 of the jaw 20 and the localised base regions 6a and 6b. In this way, there can be ensured maximum stability of clamping of the insert 1 within the tool holder, irrespective of tolerances of manufacture both of the insert and the tool holder.

Whilst in the embodiment described above the surfaces 6 and 9 of the insert 1 are provided with V-shaped grooves 26, 28 whilst the surfaces 17 and 18 of the jaws are provided with V-shaped ribs, the sloping surfaces of the insert may be provided with V-shaped ribs whilst the corresponding surfaces 17 and 18 of the jaws may be provided with V-shaped grooves.

Whilst the cutting tool arrangement in accordance with the invention has been described above as applied to a stationary tool holder, the invention is equally applicable where the inserts are to be inserted into appropriate slots formed in the periphery of a rotary tool holder.

FIG. 4 illustrates a tool holder 21 provided with a cutting insert 30 in accordance with the invention having, in addition to a front cutting edge 23a also side cutting edges 23b, a suitable chip former construction (not shown) being provided. The insert 30 is therefore multi-directional and can be employed for both parting as well as lateral turning operations. The use of such a multi-directional cutting insert 30 in lateral turning gives rise to transversely directed cutting forces and in order to ensure the stability of the insert 21 vis a vis such forces the tool holder 21 is formed with clamping jaws 24a and 24b which are forced into clamping contact with the insert 30 by suitable tightening of a tool block 25 in which the tool holder is held.

In the construction described above, with reference to FIGS. 2 and 3, localised base regions 6a and 6b of

V-shaped groove ≥6

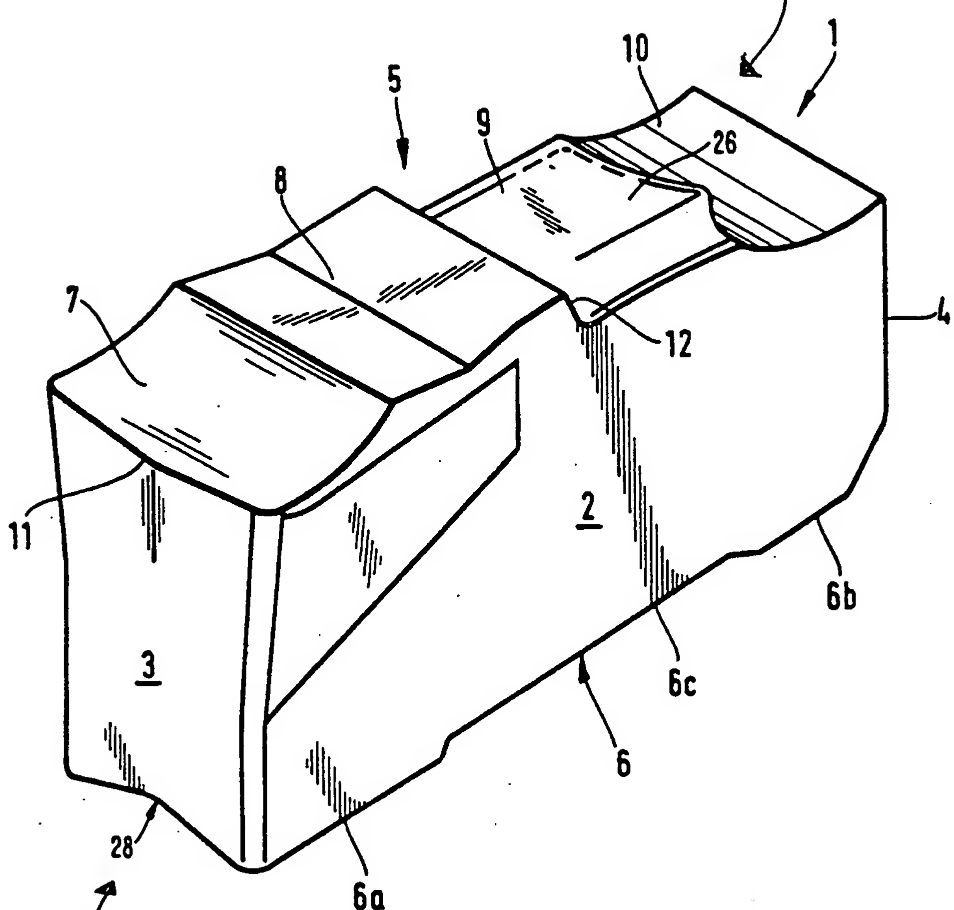

Fig. 1

V-shaped groove ≥8

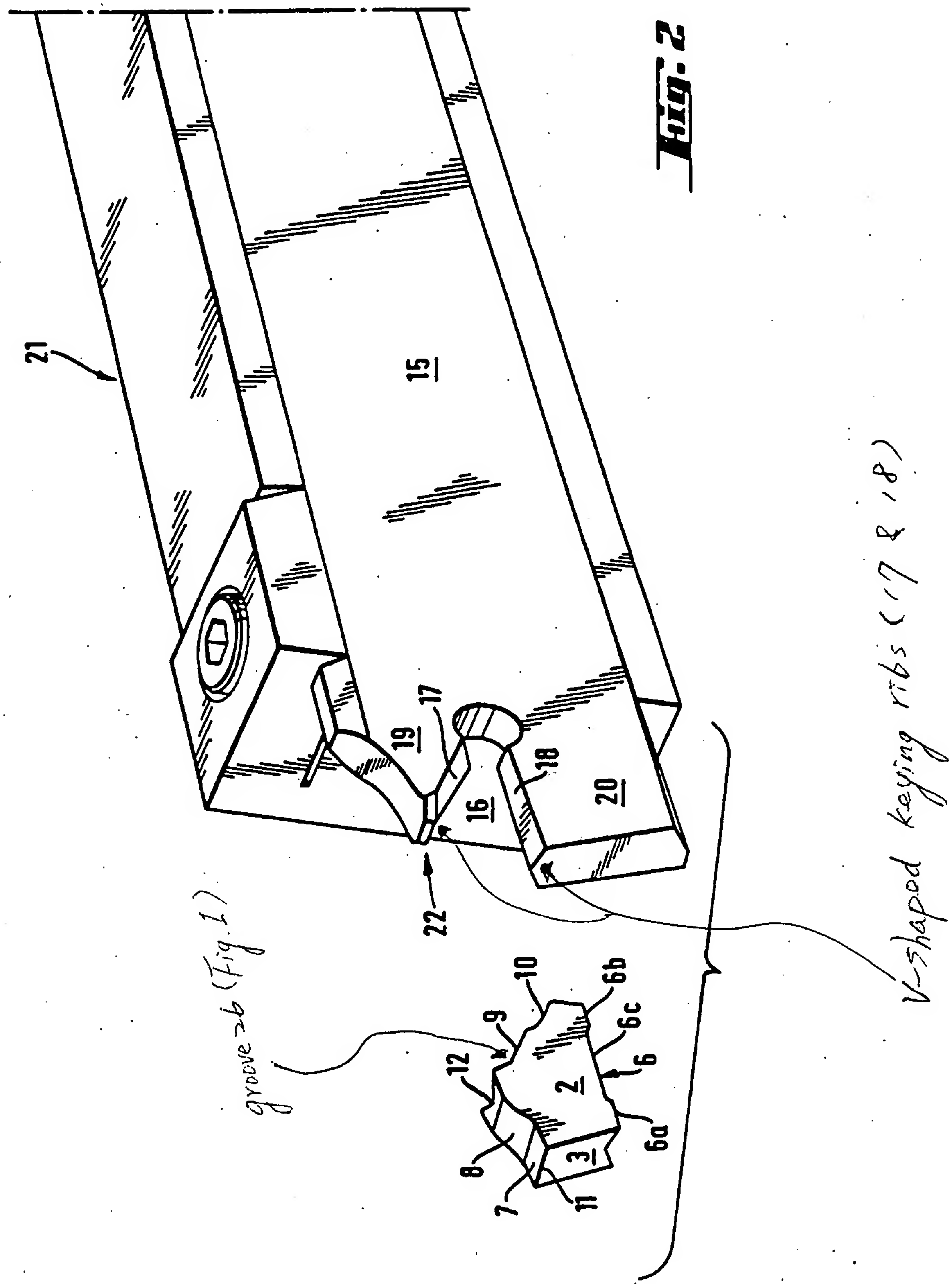
21
15
19
17
18
16
20
22
10
6b
9
6c
6
12
2
6a
8
3
7
11
V-shaped keying ribs (17 & 18)
groove 2b (Fig. 1)

Fig. 2